IN THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently amended) A method ~~of rigid point matching measured points to template points; said method~~ comprising:

acquiring measured data representing a set of measured point locations;

comparing said ~~set of~~ measured ~~point locations~~ data to template data representing a set of template point locations;

defining force field vectors operative to rigidly perturb said measured point locations into alignment with said template point locations based on said comparing; and

~~responsive to said defining, matching~~ calibrating said set of measured point locations to said set of template point locations based on said force field vectors, wherein

the step of defining force field vectors includes generating a model of force fields, and wherein the step of ~~matching~~ comparing includes manipulating said model to obtain a desired fit between said measured point locations and said template point locations.

2. (Currently amended) The method of claim 1 wherein said ~~matching~~ comparing comprises utilizing a many-on-many point matching algorithm.

3. (Previously presented) The method of claim 2 wherein said utilizing comprises determining offsets, rotations, and position errors between said measured point locations and said template point locations.

4. (Currently amended) The method of claim 1 wherein said ~~matching~~ comparing comprises utilizing a one-to-one point matching algorithm.

5. (Previously presented) The method of claim 4 wherein said utilizing comprises determining offsets, rotations, and position errors between said measured point locations and said template point locations.

6. (Original) The method of claim 1 wherein said defining comprises creating said force field vectors to act over a prescribed range.

7. (Original) The method of claim 6 wherein said creating comprises, for distances greater than said prescribed range, dissipating a magnitude of said force field vectors with increasing distance.

8. (Original) The method of claim 6 wherein said creating comprises, for distances shorter than said prescribed range, increasing a magnitude of said force field vectors with increasing distance.

9. (Currently amended) The method of claim 6 further comprising selectively repeating said comparing, said defining, and said ~~matching~~ calibrating.

10. (Original) The method of claim 9 wherein said selectively repeating comprises selectively decrementing said prescribed range at each successive iteration of said defining.

11. (Currently amended) A computer readable medium encoded with data and instructions for rigid point matching measured points to expected points; said data and said instructions causing an apparatus executing said instructions to:

acquire measured data representing a set of measured point locations;

compare said set of measured point locations to reference data representing a set of expected point locations;

generate a model comprising a plurality of force field vectors and moment arms calculated to rigidly perturb said measured point locations into alignment with said expected point locations; and

manipulate said model by selectively repeating:

comparing, to said reference data, said measured point locations perturbed by said force field vectors and said moment arms; and

redefining said force field vectors and said moment arms responsive to said comparing;

until predetermined convergence criteria have been satisfied, whereby upon satisfying said convergence criteria, said measured point locations are calibrated to said expected point locations.

12. (Original) The computer readable medium of claim 11 further encoded with data and instructions; said data and said instructions further causing an apparatus executing said instructions to compare said set of measured point locations to said set of expected point locations utilizing a many-on-many point matching algorithm.

13. (Original) The computer readable medium of claim 12 further encoded with data and instructions; said data and said instructions further causing an apparatus executing said instructions to determine offsets, rotations, and position errors between said measured point locations and said expected point locations.

14. (Original) The computer readable medium of claim 11 further encoded with data and instructions; said data and said instructions further causing an apparatus executing said instructions to compare said set of measured point locations to said set of expected point locations utilizing a one-to-one point matching algorithm.

15. (Original) The computer readable medium of claim 14 further encoded with data and instructions; said data and said instructions further causing an apparatus executing said instructions to determine offsets, rotations, and position errors between said measured point locations and said expected point locations.

16. (Original) The computer readable medium of claim 11 further encoded with data and instructions; said data and said instructions further causing an apparatus executing said instructions to create said force field vectors to act over a prescribed range.

17. (Original) The computer readable medium of claim 16 further encoded with data and instructions; said data and said instructions further causing an apparatus executing said instructions to decrement said prescribed range at each successive iteration of said redefining.

18. (Currently amended) A method of measuring probe locations in a probe card analyzer system; said method comprising:

acquiring measured data representing a set of probe point locations;

comparing said set of probe point locations to reference data representing a set of expected point locations;

responsive to said comparing, generating a model comprising a plurality of force field vectors and moment arms operative to rigidly perturb said probe point locations into alignment with said expected point locations; and

manipulating said model by selectively repeating:

computing modified probe point locations representative of said probe point locations perturbed by said force field vectors and said moment arms; and

redefining said force field vectors and said moment arms responsive to said computing;

until predetermined convergence criteria have been satisfied, whereby upon satisfying said convergence criteria, said measured point locations are calibrated to said expected point locations.

19. (Original) The method of claim 18 wherein said acquiring comprises utilizing an imaging apparatus.

20. (Original) The method of claim 18 wherein said computing comprises determining offsets, rotations, and position errors between said probe point locations and said expected point locations.

21. (Original) The method of claim 18 wherein said defining and said redefining comprise creating said force field vectors to act over a prescribed range.

22. (Original) The method of claim 21 wherein said redefining comprises decrementing said prescribed range at each successive iteration of said redefining.

23. (Previously presented) A method of rigid point matching, the method comprising:

generating a force field model, including the steps of

modeling force field vectors based on a comparison of a set of measured point locations to a set of template point locations,

generating a set of perturbed point locations by rigidly perturbing the measured point locations into alignment with the template point locations using the force field vectors, and

iteratively repeating the steps of generating and providing to obtain a desired correlation between the set of perturbed point locations and the set of template point locations wherein, a prescribed range of influence over which each modeled force field vector acts is reduced for each iteration, whereby upon obtaining the desired correlation, the measured point locations are calibrated to the template point locations.

24. (Previously presented) The method of claim 23 and further comprising providing a set of matched point locations by matching selected ones of the set of perturbed point locations to corresponding ones of the set of template point locations, wherein the matching selected ones to corresponding ones includes determining offsets, rotations, and position errors between the selected ones and corresponding ones.

25. (Previously presented) The method of claim 23 wherein magnitude of the each force field vector is dissipated with increasing distance for distances greater than the prescribed range.

26. (New) The method of claim 1 wherein said set of template point includes fiducial marks.

27. (New) The method of claim 1 wherein said set of measured point locations includes measured locations of probe tips.

28. (New) A calibration method comprising:

acquiring measured data representing a set of measured point locations;

comparing said set of measured point locations to template data representing a set of template point locations;

defining force field vectors operative to rigidly perturb said measured point locations into alignment with said template point locations; and

responsive to said defining, ~~matching~~ calibrating the set of measured point locations to the set of template point locations, wherein

the step of defining force field vectors includes generating a model of force fields, wherein the step of matching includes manipulating said model to obtain a desired fit between said measured point locations and said template point locations.

29. (New) A method of calibrating a semiconductor probe card comprising a plurality of probes, the method comprising:

acquiring measured data representing measured locations of the tips of the plurality of probes;

comparing the measured data to template data, the template data indicating desired locations of the tips of the plurality of probes;

defining force field vectors calculated to rigidly perturb the tips of the plurality of probes into alignment with the desired locations;

adjusting the measured data in accordance with an application of the force field vectors;

redefining the force field vectors based on a comparison of the adjusted measured data to the template data; and

optionally and selectively repeating the steps of adjusting and redefining to obtain a calibration of the plurality of probes.

30. (New) The method of claim 29, wherein the comparing includes:

identifying position and orientation of the plurality of probe tips relative to one another; and

matching the identified positions and orientations with corresponding positions and orientations of one or more of the desired locations to obtain the calibration.

31. (New) The method of claim 29, wherein the template data includes fiducial data derived from fiducial marks are provided on a fiducial plate.

32. (New) A method of testing alignment of a plurality of semiconductor probes comprising:

acquiring measured data representing locations of the tips of the plurality of probes;

comparing the measured data to template data, the template data indicating desired locations of the tips of the plurality of probes;

defining force field vectors calculated to rigidly perturb the tips of the plurality of probes into alignment with the desired locations; and

adjusting the measured data in accordance with the application of the force field vectors to obtain a fit between the measured data the template data; and

for each of the plurality of probes, determining deviation of the position and orientation of a tip of the each probe from position and orientation of corresponding desired locations.

33. (New) The method of claim 32, and further comprising iteratively repeating the steps of comparing, defining and adjusting to obtain an optimal fit between the measured data the template point locations.

34. (New) The method of claim 32, wherein the plurality of probe tips are arranged in an array on a probe card.

35. (New) The method of claim 32, wherein the template data includes fiducial data derived from a set of fiducial marks disposed into the structure of a fiducial plate.